

# Accelerating ITS Deployment Workshop

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*ITS American Annual Meeting, June 12, 2016, San Jose, CA*

## **I. Introduction**

The Intelligent Transportation Systems Joint Program Office (ITS JPO) held a one day Accelerating ITS Deployment Workshop in conjunction with the ITS America Annual Meeting in San Jose, CA on June 12<sup>th</sup> 2016. This public workshop served as a means for the ITS JPO to fulfill its mission of promoting adoption of ITS technologies throughout the United States. The workshop focused on accelerating the deployment of advanced ITS such as connected vehicles and smart cities technologies. Speakers highlighted the ITS Joint Program offices ITS program, discussed the “nuts and bolts” of connected vehicles, provided an overview of ITS funding, and discussed the Smart City Challenge and the Fixing America’s Surface Transportation Act.

## **II. Workshop Overview**

The year 2016 marks the ITS JPO’s 25th anniversary of conducting research into how intelligent transportation technologies can advance our nation’s transportation system to one that is safer, more efficient, greener, and smarter. The 25 years of research bring us to where we are today—at the cusp of some of the most monumental changes to our nation’s transportation system in decades. The United States is nearing the deployment of new vehicle technologies that have tremendous potential to save lives, reduce congestion, and lessen the impact of transportation on our environment.

The purpose of the workshop was to provide the public with an understanding of how the ITS JPO is accelerating the deployment of ITS technologies such as connected and automated vehicles and to provide an overview of ITS funding, the current Connected Vehicle Pilots program, the Smart City Challenge and how the Fixing America’s Surface Transportation (FAST) Act supports the advancement of ITS.

### **Workshop Organization**

The workshop was organized as a one (1) day event that was open to the ITS America Annual Meeting attendees as well as the general public. The event included the following:

- A welcome and introductory overview of ITS and the ITS JPO led by USDOT staff members from the USDOT headquarters in Washington, DC.
- A session providing a high level connected vehicle summary where speakers discussed key policy challenges, the vehicle-to-vehicle (V2V) rulemaking by the National Highway Traffic Safety Administration (NHTSA), vehicle-to-infrastructure (V2I) guidance, an overview of the V2I Deployment coalition, and the relationship between connected and automated vehicles.

- A session on the enabling factors of connected vehicles, with discussions on research highlights, the technology involved, the necessary ITS standards, security elements, and the certification process.
- A session on ITS funding which included overviews for both the CV Pilots and Smart Cities Challenge efforts and a discussion on the relationships between ITS planning and the Fast Act grants.

### III. USDOT/ITS JPO Overview

#### **ITS Joint Program Office Introduction** <sup>1</sup>

Ken Leonard, Director, ITS JPO, provided the workshop overview and discussed the importance of ITS for the Nation’s transportation system. He outlined the history of ITS and the JPO, with an emphasis on how the research conducted over the past 25 years is now coming into fruition. The work that is currently being undertaken by the USDOT is making its way from the test facilities and into the real world. He described the vision of the ITS Program’s research as a national, multimodal surface transportation system of connected vehicles, infrastructure, and passengers’ portable devices. This connected environment will leverage technology to maximize safety, mobility, and environmental performance.

Mr. Leonard provided an overview of the current *ITS Strategic Plan 2015-2019* and how it provides a framework around which the ITS JPO and other Department agencies will conduct research, development, and adoption activities to achieve ITS program goals. He described the research being undertaken by each of the six JPO program categories: connected vehicles, automation, emerging capabilities, interoperability, enterprise data and accelerating deployment.

### IV. High-level Connected Vehicle (CV) Summary

#### **Key Policy Challenges (Security, Privacy, Spectrum)** <sup>3</sup>

Kevin Gay of the ITS JPO discussed the policy issues involved with deployment of ITS. He described the ITS JPO’s role in providing the Federal policy leadership for successful implementation of ITS technologies and connected vehicles. He discussed the JPO’s current work regarding the policy areas of security, communications, data, interoperability, deployment strategies, and deployment readiness policies. Policy Research enables the USDOT to play a targeted role in advancing transportation technologies for the Nation and ensures that the role is within scope of its legal authority.

#### **Vehicle-to-Vehicle (V2V) Notice of Proposed Rule Making (NPRM)** <sup>2</sup>

Blair Anderson of the National Highway Traffic Safety Administration (NHTSA) discussed NHTSA’s role in connected vehicle implementation and the importance of roadway safety. He provided a brief background on the technology behind connected vehicles as well as the current progress of the NHTSA developed Federal notice of proposed rulemaking (NPRM). The NPRM once finalized by the Office of Management and Budget (OMB) will require all vehicles to be equipped with connected vehicle technologies, which will enable the realization of safety and other benefits.

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#### **Vehicle-to-Infrastructure (V2I) Guidance and V2I Deployment Coalition 4**

Jonathan Walker of the Federal Highway Administration (FHWA) provided an overview of Vehicle-To-Infrastructure (V2I) Deployment Guidance and the V2I Deployment Coalition. He began by describing current V2I work and described the five steps that states can take to begin the process of V2I implementation: 1) initiating the planning process, 2) updating regional ITS architecture, 3) consideration of participation in connected vehicle pooled fund studies, 4) becoming involved with current test bed, and 5) becoming involved with the V2I Deployment Coalition.

Mr. Walker described how the V2I Deployment Coalition works towards the acceleration of consistent and effective V2I technologies that address passenger vehicles, freight, and transit operations in both urban and rural areas. He presented background on current V2I deployment products that are available or will be available soon. In 2016, the FHWA will release updated V2I deployment guidance to assist transportation managers and operators interested in adapting their traffic signals and other roadside devices so they are compatible with connected vehicles.

#### **How CV Technology Enables Automated Vehicles 5**

Kevin Dopart of the ITS JPO described the benefits that would emerge from connected automation. He described how automation can be used as a tool for solving transportation problems and making improvements to safety, increasing mobility and accessibility and reducing energy use and emissions. Many view connected vehicles as the precursor to automated, driverless vehicles. However, the wireless communications technology from connected vehicles would also provide self-driving cars with full awareness of their surroundings so they can make judgments regarding safety-critical situations and act appropriately. He then presented existing projects that have shown that connectivity, through connected vehicle technology, is critical to achieving the greatest benefits of automation. Work undertaken by the ITS JPO's GlidePath program and recent truck platooning research has shown that automation benefits will increase through connectivity.

## **V. “Nuts and Bolts” of CV**

### **Decade of Research Highlights**

- **Transit Connected Vehicle (CV) Projects Update 6**

Steve Mortensen of the Federal Transit Administration (FTA) provided an update on connected vehicle projects involving transit specific applications. He reviewed and discussed lessons learned from four separate transit based projects that provide safety and mobility benefits to passengers and pedestrians. Those projects included the Transit Safety Retrofit Package (TRP), which was a project that tested five separate transit connected vehicle applications ranging from pedestrian warnings to emergency electronic brake lights. He discussed the CV Infrastructure - Urban Bus Operations Safety Platform (E-TRP) which includes safety applications related to pedestrians and passengers, and the Transit Bus Stop Pedestrian Warning (TSPW) Application which notifies bus operators of pedestrians at bus stops. Both of these projects are currently being tested by the Greater Cleveland Regional Transit Authority. The

Integrated Dynamic Transit Operations (IDTO) is a bundle of three mobile device applications that provide benefits to passengers through transit connections protection, dynamic transit information as well as a dynamic ridesharing applicaiton.

- Lessons Learned from CV Pilots 7

Jonathan Walker of the FHWA provided an overview of the current lessons learned from the Connected Vehicle Pilot program. He described the lessons learned in the CV Pilots development phase as well as how the program has applied lessons learned from the earlier Safety Pilots program to the CV Pilots work. Some of the major points described were that it is beneficial to involve stakeholders early in the project process and that allowing for site-to-site interaction in a noncompetitive format between the three locations, has allowed for greater cooperation on security, vendor interaction, stakeholder coordination throughout the process.

- Major Stakeholders: CAMP, VIC, OEMs and device makers 8

Kevin Gay of the ITS JPO described the connected vehicle stakeholder process and some of the methods used, accomplishments achieved, and the products that have been developed as a result. The connected vehicle program has numerous stakeholders such as vehicle manufacturers, public agencies, industry, academia, and associations. Each stakeholder group has a purpose and in order for connected vehicles to be implemented, coordination and cooperation with stakeholders must be undertaken. Opportunities and events related to stakeholder engagement were provided at the end of the discussion.

- Existing & Affiliate Test Beds and Future Pilots9

Kevin Gay of the ITS JPO described the Connected Vehicle Affiliated Test Bed Program. He described the vision, the charter and ways to become a Test Bed member. Current members come from private enterprise, academia and government agencies. Through membership, associated groups are able to receive assistance with their connected vehicle research. The test bed program provides benefits to researchers such as technical assistance and helps further the progression of a nation-wide connected vehicle deployment through common platforms.

### ITS Foundation and Technology 10-1

Steve Sill of the ITS JPO described the ITS foundation that comes from a national connected vehicle architecture, the benefits that arise from ITS standards, and the importance of security and certification. The ITS JPO through the ITS Architecture and Standards Program is working toward the goals of enabling secure, effective, interoperable and affordable ITS infrastructure; and for connected vehicle and automated vehicle deployments across the nation. He provided an overview of how each of the ITS foundations described above fit together in order to enable a safe and secure connected vehicle environment.

### Standards for CV Deployment 10-2

Steve Sill of the ITS JPO described in detail the ITS Architecture and Standards Programs, beginning with the history of architecture and standards work and providing an overview and status of the various projects being undertaken. He described the connected vehicle architecture and the available tools and deployment support for implementers, such as the Connected Vehicle Reference Implementation

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Architecture (CVRIA) and Systems Engineering Tool for Intelligent Transportation (SET-IT) software. The discussion then shifted to standards work and an overview of the role that standards play in ensuring successful connected vehicle deployments and the importance of participation from stakeholders throughout the process.

### **Security 11**

Kevin Gay of the ITS JPO described the Security Credential Management System (SCMS) which is the key to ensuring that connected vehicles remain secure and messages are encrypted. He provided an overview of how SCMS operates in securing the basic safety messages, which are emitted from each connected vehicle and are the backbone of how the connected vehicles communicate. He then provided an overview on the management and operation of the SCMS by defining the message types, requirements, and specifications of the system. Currently the JPO is working towards establishing an updated SCMS proof-of-concept system.

### **Certification 12**

Kevin Gay of the ITS JPO provided an update of the Certification program. The program is responsible for creating and updating existing test specifications, developing test methods and test tools, supporting test automation, conducting device testing, developing a process for issuance of certificates of compliance, and developing a business plan for certification. He provided an update on the three certification service providers which were competitively selected by the USDOT. The three organizations will work on continuing to develop the certification industry and will also provide certification services during the CV Pilots Build and Operation phases on a fee-for-service basis.

### **ITS Data Program 13**

Paul Pisano of the FHWA provided an update of the ITS Data Program. He provided background on the growing demands and needs for the ever increasing amounts of data created. With increasing connectivity among vehicles, organizations, systems, and people, unprecedented amounts of data are being generated. New methods to collect, transmit/ transport, sort, store, share, aggregate, fuse, analyze, and apply these data will be needed for management and operations of transportation systems. He provided an overview of the approach the ITS Data Program is taking to identify and develop data toolsets and to help provide early and consistent guidance as well as practical technical assistance to ITS projects.

## **VI. Funding for ITS**

### **CV Pilots 14**

Jonathan Walker of the FHWA provided an overview of the Connected Vehicles Pilot Deployment Program. He discussed the program goals and provided a description of the three sites – New York City, Tampa and Wyoming – along with the anticipated schedule of three sequential phases. Phase 1 will create the foundational plan to enable further design and deployment. Phase 2 will involve the detailed

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design and deployment of the CV systems followed by testing to ensure deployment functions as intended (both technically and institutionally), and Phase 3 will focus is on assessing the performance of the deployed systems. He then provided a greater understanding of the current lessons learned in dealing with issues such as complexity, collaboration and the technical challenges.

#### **Smart Cities Challenge 15**

Kevin Dopart of the ITS JPO provided an update on the USDOT Smart Cities Challenge. At the time of the workshop, the USDOT had not yet announced the winner. Mr. Dopart provided background on what the Smart Cities Challenge is, what it hopes to accomplish and how this challenge fits into the USDOT's vision for the future. The Smart City Challenge is a national competition to implement bold, data-driven ideas that demonstrate the use of advanced data and ITS technologies to make transportation safer, easier, and more reliable in one mid-sized city. These innovations will connect people, vehicles, public transportation, and infrastructure through intelligent transportation systems, the sharing economy, and other technologies. Mr. Dopart described the twelve vision elements that the Smart Cities Challenge applicants were encouraged to address. He provided an update on the Challenge including the seven cities chosen as finalists and the major challenges identified by cities across the nation.

#### **Wrap-up, Fast Act and ITS Planning Discussion16**

Egan Smith, [Managing Director, of the](#) ITS JPO, provided a wrap-up of the Deployment Day Workshop by providing a review of the discussions, information on funding opportunities, as well as leading an ITS planning discussion with the workshop participants. This session of the workshop provided a review of the topics that were discussed throughout the sessions and provided resources on where to find further information through the Professional Capacity Building program. The main takeaways were: that the USDOT along with numerous stakeholders are working on research ~~and~~ projects that will further accelerate the deployment of ITS and connected vehicle technology, and that integrating ITS into the planning process is critical for deployment success.

## **Accelerating ITS Deployment Workshop Agenda**

Sunday June 12<sup>th</sup>, 2016

### **I. Workshop Overview and Agenda (8:00 – 8:10am)**

### **II. USDOT/ITS JPO Overview (8:10 – 8:20am)**

- a. Strategic Plan 2015-19
- b. Challenges

### **III. High-level Connected Vehicle (CV) Summary (8:20 – 9:50am)**

- a. Key Policy Challenges (Security, Privacy, Spectrum)
- b. V2V NPRM
- c. V2I Guidance
- d. Vehicle-to-Infrastructure Deployment Coalition
- e. How CV Technology enables Automotive Vehicles

### **Mid-morning break (9:50-10:00am)**

### **IV. “Nuts and Bolts” of CV (10:00 – 11:45am)**

- a. Decade of Research Highlights
  - i. Lessons Learned (successes and failures of “Connected Vehicles”) over the last decade
  - ii. Major Stakeholders: CAMP, VIC, OEMS, and device makers
  - iii. Existing & Affiliate Test Beds and Future Pilots
- b. ITS Foundation and Technology
  - i. National and CV architecture
  - ii. Overview and status
  - iii. Architecture tools and deployment support
  - iv. Architecture evolution-what is next?
- c. ITS Standards for CV Deployment
  - i. Overview and status
  - ii. In progress: Standards for the entire CV architecture (“HGT#7”)
  - iii. Standards needs and participation opportunities
  - iv. Overview and status
  - v. In progress: Standards for the entire CV architecture (“HGT#7”)
  - vi. Standards needs and participation opportunities
- d. Security
  - i. SCMS Development Schedule

- ii. SCMS Interface Requirements
- iii. SCMS Release Schedule
- e. Certification

**Lunch Break (11:45am-1:00pm)**

**V. Funding for ITS (1:00pm-2:30pm)**

- a. CV Pilots
  - i. Desired outcomes
  - ii. Status
  - iii. Future Steps
- b. Smart Cities Challenge
  - i. Vision and expected outcomes
  - ii. Status
  - iii. Future Steps
- c. Fast Act and ITS Planning Discussion
  - i. Fast Act Grants
  - ii. Fast Act Language (V2V/V2I)
  - iii. ITS Planning and JPO Resources
  - iv. Wrap-up